

Amendment to the Claims

This listing of claims will replace all prior versions and listing of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A three-dimensional graphical user interface element rendered in three-dimensional object space, the element comprising at least one active location for adjusting a texture, wherein the texture is mapped onto an arbitrarily-shaped, user-defined region of a surface of a three-dimensional virtual object, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region.

Claim 2 (original) The graphical user interface element of claim 1, wherein the at least one active location for adjusting the texture comprises at least one member selected from the group consisting of:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 3 (original) The graphical user interface element of claim 1, wherein the at least one active location for adjusting the texture comprises at least two members selected from the group consisting of:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 4 (original) The graphical user interface element of claim 1, wherein the at least one active location for adjusting the texture comprises:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 5 (original) The graphical user interface element of claim 1, wherein the texture is an image.

Claim 6 (original) The graphical user interface element of claim 1, wherein the texture comprises a tiled pattern.

Claim 7 (original) The graphical user interface element of claim 1, wherein the texture is an embossing pattern.

Claim 8 (original) The graphical user interface element of claim 7, wherein the at least one active location for adjusting the texture comprises an active location for adjusting an embossing height normal to the surface of the virtual object.

Claim 9 (original) The graphical user interface element of claim 7, wherein the at least one active location for adjusting the texture comprises an active location for adjusting an embossing depth normal to the surface of the virtual object.

Claim 10 (currently amended) A three-dimensional haptic graphical user interface element comprising at least one active location for adjusting a texture, wherein the texture is mapped onto an arbitrarily-shaped, user-defined region of a surface of a three-dimensional virtual object, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region, and wherein the at least one active location is associated with haptic feedback.

Claim 11 (original) The haptic graphical user interface element of claim 10, wherein the at least one active location comprises at least one member selected from the group consisting of:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 12 (original) The haptic graphical user interface element of claim 10, wherein the haptic feedback comprises a gravity well associated with an active location.

Claim 13 (original) The haptic graphical user interface element of claim 10, wherein the haptic feedback comprises a haptic constraint.

Claim 14 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to the surface of the virtual object.

Claim 15 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to the user-defined region.

Claim 16 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to an axis.

Claim 17 (original) The haptic graphical user interface element of claim 16, further comprising at least one haptic detent active on the axis.

Claim 18 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to a loop.

Claim 19 (original) The haptic graphical user interface element of claim 18, further comprising at least one haptic detent active on the loop.

Claim 20 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for rotating the texture.

Claim 21 (previously presented) The haptic graphical user interface element of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for translating the texture.

Claim 22 (original) The haptic graphical user interface element of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for scaling the texture.

Claim 23 (currently amended) A method for adjusting a texture within a user-defined region of a surface of a three-dimensional virtual object, the method comprising the steps of:

(a) rendering a three-dimensional graphical user interface element in three-dimensional object space, the element comprising at least one active location for adjusting a two-dimensional texture within an arbitrarily-shaped, user-defined region of a surface of a three-dimensional virtual object, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region; and

(b) adjusting the texture according to a user manipulation at the at least one active location, wherein the adjusting of step (b) comprises modifying a transformation matrix used in mapping points on the surface of the virtual object to points on the texture.

Claim 24 (original) The method of claim 23, further comprising the step of:

(c) graphically rendering the virtual object with the adjusted texture.

Claim 25 (original) The method of claim 24, wherein the graphical rendering of step (c) comprises providing a preview of the virtual object with the adjusted texture without changing a volumetric representation of the three-dimensional virtual object.

Claim 26 (original) The method of claim 25, wherein the volumetric representation is a voxel-based representation.

Claim 27 (original) The method of claim 25, further comprising the step of:

(d) modifying the volumetric representation of the three-dimensional virtual object upon an activation of a user signal.

Claim 28 (original) The method of claim 27, wherein the activation of the user signal comprises at least one of a button click and a button release.

Claim 29 (original) The method of claim 23, further comprising the steps of:

- (c) arming a haptic constraint; and
- (d) disarming the haptic constraint.

Claim 30 (currently amended) An apparatus for adjusting a texture within a user-defined region of a surface of a three-dimensional virtual object, the apparatus comprising:

- (a) a memory for storing a code defining a set of instructions; and
- (b) a processor for executing the set of instructions, wherein the code comprises a graphical user interface module adapted to provide a three-dimensional graphical user interface

element rendered in three-dimensional object space, the element comprising at least one active location for adjusting a texture within an arbitrarily-shaped, user-defined region of a surface of a three-dimensional virtual object, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region.

Claim 31 (original) The apparatus of claim 30, wherein the code further comprises a selection module adapted to select one of the at least one active locations of the graphical user interface element based on a two-dimensional correspondence of the active location and a cursor.

Claim 32 (original) The apparatus of claim 31, wherein the code further comprises a repositioning module adapted to move the cursor to a three-dimensional position corresponding to one of the at least one active locations of the graphical user interface element.

Claim 33 (original) The apparatus of claim 30, wherein the graphical user interface element is a haptic graphical user interface element, and wherein the at least one active location is associated with haptic feedback.

Claim 34 (previously presented) The graphical user interface element of claim 1, the element graphically represented in three-dimensional object space with at least one of:

- (i) a position that relates to a position of the mapped texture;
- (ii) a scale that relates to a scale of the mapped texture; and

- (iii) an orientation that relates to an orientation of the mapped texture.

Claim 35 (previously presented) The graphical user interface element of claim 1, the element graphically represented in three-dimensional object space with at least two of:

- (i) a position that relates to a position of the mapped texture;
- (ii) a scale that relates to a scale of the mapped texture; and
- (iii) an orientation that relates to an orientation of the mapped texture.

Claim 36 (previously presented) The graphical user interface element of claim 1, the element graphically represented in three-dimensional object space with a position, scale, and orientation that relate to a position, scale, and orientation of the mapped texture.

Claim 37 (previously presented) The graphical user interface element of claim 1, the element comprising a plurality of active locations for adjusting the texture.

Claim 38 (previously presented) The graphical user interface element of claim 37, wherein at least two of the plurality of active locations perform different functions.

Claim 39 (previously presented) The graphical user interface element of claim 1, wherein the graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 40 (previously presented) The haptic graphical user interface element of claim 10, wherein the haptic graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 41 (previously presented) The method of claim 23, wherein the graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 42 (previously presented) The apparatus of claim 30, wherein the graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claims 43 – 44 (canceled)

Claim 45 (previously presented) The method of claim 1, wherein the surface of the three-dimensional virtual object is non-planar, non-spherical, and non-cylindrical.

Claim 46 (previously presented) The apparatus of claim 30, wherein the surface of the three-dimensional virtual object is non-planar, non-spherical, and non-cylindrical.

Claim 47 (previously presented) The method of claim 1, wherein a boundary of the texture is not constrained to align with a boundary of the arbitrarily-shaped, user-defined region.

Claim 48 (previously presented) The apparatus of claim 30, wherein a boundary of the texture is not constrained to align with a boundary of the arbitrarily-shaped, user-defined region.